

CASE REPORT

Chinese green tea and acute hepatitis: a rare yet recurring theme

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SUMMARY

A previously healthy 16-year-old girl presented with signs of acute hepatitis. On initial enquiry, she had not taken any prescribed or 'over-the-counter' medications, and there was no recent travel history. Further investigations revealed no viral, autoimmune or metabolic cause of hepatitis. Only following specific questioning did she reveal that she had, in the preceding 3 months, regularly consumed internet ordered Chinese green tea, which contained *Camellia sinensis*. After ceasing green tea consumption, there was a rapid and sustained recovery of her hepatitis. The authors discuss the probable cause of herbal tea in this case of acute hepatitis, and the importance of awareness of this rare yet recurring theme for patients and clinicians alike.

BACKGROUND

Herbal and dietary supplements are a known cause of hepatotoxicity,¹ but patients often tend to neglect reporting their use and therefore a potential aetiology goes unrecognised by physicians. Although it is important to rule out other causes, an association between green tea containing *Camellia sinensis* and hepatitis has been reported.²

CASE PRESENTATION

A 16-year-old girl, born in Yemen, with no medical history, presented to her general practitioner with nausea, generalised arthralgia and non-specific abdominal pains. She was initially thought to have a urinary tract infection for which she was prescribed amoxicillin. Only two doses were taken before she presented to hospital via the accident and emergency department, with worsening symptoms. At this stage, she was noted to be jaundiced, and was referred to the acute medical team. She denied ingestion of alcohol, taking any 'over-the-counter' medications such as paracetamol, or illicit drug use. There was no recent travel history or previous blood transfusions. Her pregnancy test was negative and there was no family history of note. On physical examination, she had a temperature of 37.6°C, her blood pressure was 124/78 mm Hg with a heart rate of 98 bpm; she was jaundiced, however, there was no palpable abdominal tenderness or hepatosplenomegaly. The remainder of the examination was normal. On re-assessment of the history, the patient admitted to ordering Chinese green tea over the internet, and had been consuming over three cups a day over the preceding 3 months. When questioned as to why, she explained that she had been told it had weight-loss properties.

INVESTIGATIONS

Initial laboratory investigations demonstrated highly elevated alanine transaminase with normal alkaline phosphatase. The patient had hyperbilirubinaemia, with a deranged international normalised ratio and normal albumin (table 1). Baseline haematology showed elevated white cell count ($16.7 \times 10^9/L$) with normal C reactive protein, normal renal function and normal thyroid function. Plasma levels for paracetamol and salicylates were normal. Testing for hepatitis A (anti-HAV IgM), B (surface antigen and core antibody) and C (antibody) were all negative. Investigations for cytomegalovirus and parvovirus B19 infection indicated historic exposure (both IgG positive but IgM negative). Immunoglobulins (IgA, IgG, IgM) were normal. Tests for autoimmune disease including anti-liver-kidney microsomal type 1 antibodies were negative, and anti-smooth muscle antibody was only weakly positive (1:40 titre). Furthermore, antinuclear and antimitochondrial antibodies were negative. Investigations including serum ceruloplasmin, α -1-antitrypsin and iron studies were all normal. An abdominal ultrasound scan showed the liver to be of normal size and echogenicity, with no focal abnormality and normal portal flow, and a gallbladder with no stones and no intrahepatic or common bile duct dilation. Ultrasound of the spleen did not show any enlargement and the kidneys were of normal size and consistency with no sign of hydronephrosis.

DIFFERENTIAL DIAGNOSIS

In a case of acute hepatitis, viral hepatitis and autoimmune hepatitis need to be excluded, as do rarer causes such as disturbances in portal venous flow (eg, Budd-Chiari syndrome). As our patient was <40 years of age, Wilson's disease needed to be considered in addition to other metabolic conditions such as haemochromatosis and α -1-antitrypsin deficiency. Using clinical judgement, a diagnosis of drug induced or, in this case, herbal tea induced, hepatitis could then be considered.



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Table 1 Laboratory results (reference range)

ALT	4371 U/L (normal range 5–41)
ALP	84 U/L (normal range <187)
Bilirubin	198 μ mol/L (normal range <22)
Albumin	45 g/L (normal range 34–51)
INR	1.9 (normal range 0.8–1.2)

ALP, alkaline phosphatase; ALT, alanine transaminase; INR, international normalised ratio.

TREATMENT

Owing to the initial severity of the acute hepatitis, the patient was referred to the inpatient hepatology team. On cessation of the herbal tea and treatment with intravenous fluids and N-acetylcysteine, her hepatitis completely resolved and the patient was discharged from hospital after a short admission.

OUTCOME AND FOLLOW-UP

The patient was followed up 2 months after discharge in an outpatient hepatology clinic. She had normal liver function results and had not taken any further green tea; she was subsequently discharged from the clinic. With other causes of acute hepatitis excluded, and the complete clinical and biochemical resolution observed, green tea (*C. sinensis*) was proposed as the causative agent.

DISCUSSION

We report a patient presenting with reversible severe acute hepatitis following consumption of green tea (*C. sinensis*). Causality was assessed using both clinical judgement and the Council for International Organizations of Medical Sciences (CIOMS/RUCAM) scale,^{3 4} which defined the case as 'probable' when accounting for time relation, risk factors, concomitant medication, established hepatotoxicity data and outcome.

Herbal remedies, including tea extracts from *C. sinensis*, are readily available from unregulated sources, for example, on the internet, and are increasingly used. Hepatotoxicity has been widely related to green tea, with reported cases due to ingestion of ethanolic extract, tea leaf powder and infusions.² Despite this, no uniform pattern of hepatotoxicity has been identified and symptoms may range from asymptomatic elevation in liver enzymes to hepatic failure requiring transplantation, and even causing death.⁵ There has been a previously reported case of a patient developing fulminant hepatitis requiring liver transplantation following consumption of dry extract of green tea (*C. sinensis*), which was used as an adjuvant therapy for a weight loss programme.⁶ A recent case study reported the association between hepatitis and concurrent consumption of concentrated herbal extracts from green tea, with a very high dose level of epigallocatechin gallate and epicatechin.⁷ Authors of another case have hypothesised green tea infusions (*C. sinensis*) as a potential trigger for autoimmune hepatitis.⁸

We acknowledge that green tea is predominantly a very safe and healthy drink, with antioxidant properties. It is the secondary or tertiary processed products, rather than the freshly made leaves, that have been described in previous case reports.^{6–8} This raises the possibility that it is the addition of other chemicals causing hepatotoxicity, particularly in preparations used for weight loss. Also, pesticides may be widely used during the growing of tea trees and are known to contaminate green tea infusions.⁹ There is potential for pesticide-induced hepatitis to exist, especially from less regulated products ordered from developing countries over the internet.

In conclusion, the use of herbal remedies is under-reported, the breadth of use is under-recognised by clinicians and scoring systems used for diagnosis are not validated for herbal hepatotoxicity.¹ Our case is a good illustration of this rare but recurring theme.

Patient's perspective

I had bought the green tea over the internet to lose weight. I bought 2 boxes of 100 bags of tea and was drinking about 3 cups a day for a few months. I had only lost a couple of pounds but then started having horrible pains in my joints, and felt very dizzy and sick. I was very scared when I was admitted to hospital and had lots of tests, I didn't fully understand what was going on at the time. Now I look back it was definitely due to the tea, I never took anything else and it all started happening after drinking the tea. I will never buy any online tea again or any weight loss pills. People should be more aware of what they are buying and the side effects. Most of the ingredients of the tea I bought were written in Chinese.

Learning points

- ▶ It is important to compile a comprehensive drug history, including herbal and dietary supplements, especially those bought over the internet.
- ▶ Diagnosis of drug-induced hepatitis should be a diagnosis of exclusion.
- ▶ There is a need for healthcare workers and the public to be aware of herbal hepatotoxicity.

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Patient consent Obtained.

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